REMARKS

The present amendment is in response to the Office Action dated April 25, 2006, where claims 1-19 were rejected under 35 USC 103(a).

Claim 2 has been amended to be consistent with claim 1, and new independent claims 20 and 21 have been added, which recite features previously found in the dependent claims. No new matter has been added.

In particular, Applicant responds to the Examiner's Detailed Action and respectfully requests that all claims detailed in the application be placed in a state of allowance.

1. Clerical errors

Applicant notes that the present rejections under "35 U.S.C. 102(e)" should have read "35 U.S.C. 103(a)", and "Han et al." should have read "Chooi et al." (April 24, 2006 office action, page 2, third and fourth paragraphs, respectively).

2. Claiming only specific embodiments

The present office action notes that "the applicant cannot exclude the gas from the specification" with regards to various embodiments disclosed in the specification (April 24, 2006 office action, page 5, second paragraph). Applicant assumes that "gas" refers to nitrogen gas. However, Applicant has not amended the specification in the response dated February 15, 2006.

3. Gas vs. Gas Mixture.

In the present final action, NH_3 is referred to as a reducing/non-oxidizing gas mixture. However, this is not a correct characterization. NH3 is a reducing/non-oxidizing gas, and not a gas mixture.

As shown in TABLE 1 of Applicant's Specification, an oxidizing gas mixture may include reducing gases such as CO, but at low enough concentrations to still allow the overall gas mixture with O_2 to be an oxidizing gas mixture.

In certain embodiments, as described on page 13, lines 1-4 of the Applicant's Specification, the oxidizing gas mixture may comprise NH_3 gas or N_2/Hydrogen gas. Consequently, the concentrations of any reducing gas in an oxidizing gas mixture must be limited in relation to the oxidizing gases concentration in the mixture. Otherwise, this would become a reducing gas mixture.

Applicant had amended claim 5 in response to the previous office action to clarify the differences between the oxidizing gas mixture as recited in Applicant's claims and the reducing gas mixture of the Lui reference (U.S. 6,647,994) which includes NH_3 gas without oxygen gas.

4. Redox Chemistry of Carbon Monoxide

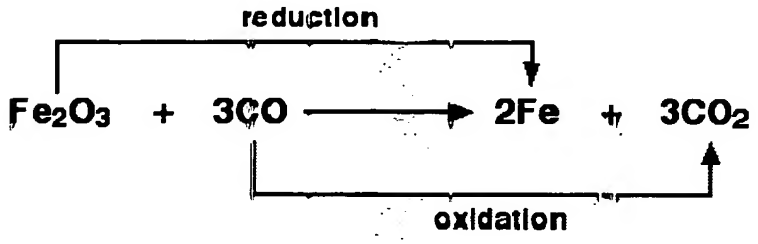
The present final action also states that "Liu clearly teaches removing a photoresist layer with oxidizing gas mixture comprising carbon monoxide (see col. 3, lines 55-61, noted that the oxidizing gas is carbon monoxide)" (April 24, 2006 office action, page 5, last paragraph).

Applicant submits that carbon monoxide is a reducing gas, and not an oxidizing gas. In fact, available chemical references or literature provide descriptions of the

chemical redox properties of carbon monoxide as being a reducing gas (see, e.g., http:// www.chemguide.co.uk/inorganic/redox/definitions.html)

According to one reference, http:// www.chemguide.co.uk/inorganic/redox/ definitions.html, the chemical redox properties of carbon monoxide are described as follows:

> *"Oxidation and reduction in terms of oxygen transfer*
>
> *Definitions*
>
> - *Oxidation is gain of oxygen.*
> - *Reduction is loss of oxygen.*
>
> *For example, in the extraction of iron from its ore:*



> *Because both reduction and oxidation are going on side-by-side, this is known as a redox reaction.*
>
> *Oxidizing and reducing agents*
>
> *An oxidizing agent is substance which oxidizes something else. In the above example, the iron(III) oxide is the oxidizing agent.*
>
> *A reducing agent reduces something else. In the equation, the carbon monoxide is the reducing agent.*
>
> - *Oxidizing agents give oxygen to another substance.*
> - *Reducing agents remove oxygen from another substance."*

Additionally, *"[c]arbon monoxide is a reducing agent, removing oxygen from many compounds and is used in the reduction of metals, e.g., iron , from their ores."* (http://en. wikipedia.org/wiki/Carbon_monoxide).

Therefore, simply put, carbon monoxide is not an oxidizing gas in the art of IC fabrication.

5. Prior art rejections of claims 1-19 (35 USC 103).

The Examiner has rejected claims 1-19 under 35 USC 103 as being anticipated by U.S. Patent 6,465,888 to Chooi et al. (hereinafter "Chooi '888") in view of U.S. Patent 6,647,944 to Lui et al.(hereinafter "Lui").

The present final action states that "Chooi et al. teaches etching the photoresist film by using carbon monoxide gas (CO) (see col. 8, lines 17-33). However, it is acknowledged that "the reference does not teach removing the photoresist film from the surface of the structure by using carbon monoxide gas" (April 24, 2006 office action, page 4, fourth paragraph).

However, Lui is described as teaching "removing the photoresist film by using carbon monoxide gas (CO) from the surface of the structure (see figures 1b-1c, col. 3, lines 65-67, col. 4, lines 1-14). Noted that the same gas would inherently provide the same function as minimizing the loss of the exposed barrier during the removal of the photoresist film" (April 24, 2006 office action, page 4, fifth paragraph).

Applicant respectfully disagrees.

A. The Chooi reference

Chooi does not teach the use of carbon monoxide to remove either the first or the second photoresist layer. Chooi mentions removing the first photoresist layer preferably by oxygen plasma ashing, an oxidizing gas mixture (see, Chooi, col. 8, lines 10-12; April 24, 2006 office action, page 4) and it is implied that the second photoresist layer is also removed in a similar manner since no specifics on removing the second photoresist layer are taught in Chooi (see, Chooi, col. 8, lines 25-29).

Removing/stripping a photoresist is a different process than etching/patterning a photoresist. Stripping is an isotropic process in which the photoresist is treated in a vertical and horizonatal direction. Etching, on the other hand, treats the photoresist only vertically. The chemistry utilized in stripping a photoresist from an IC is generally much harsher than the chemical conditions involved in etching a photoresist.

Applicant's independent claims 1, 9, 15, 20 and 21 specifically recite that the gas mixture for removing, not etching, a photoresist layer comprises carbon monoxide, a reducing agent. However, the overall gas mixture is an oxidizing mixture.

B. The Lui reference

Lui teaches removing a photoresist layer with a reducing or non-oxidizing gas mixture which comprises carbon monoxide, NH_3 and no oxygen (see, Lui, col. 3, lines 55-61, and claim 9). The gas mixture utilized by Lui is a reducing gas mixture which is entirely distinct from the oxidizing gas mixture described by the Applicant . Therefore, carbon monoxide is not an oxidizing gas (page 6), and thus, the gas mixture for removing a photoresist of Lui is not an oxidizing gas.

In fact, Lui teaches away from the use of using oxygen containing plasmas for stripping/removing photoresist (see, Lui, background section, col. 3, lines 61-64). consequently, a person skilled in the art of photoresist removal would not turn to Lui's teachings on removal of a photoresist with an oxidizing gas mixture because Lui is very specific in describing a gas mixture with no oxygen which includes NH_3.

Applicant's claims recite the removal of a photoresist layer with an oxidizing gas mixture comprising carbon monoxide. Furthermore, Applicant recites the selective removal of the photoresist layer with little or no removal of the barrier layer.

As stated in Section 2143 of the MPEP:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combined) must teach or suggest all the claim limitations.
>
> The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant's disclosure. Section 2143, MPEP Rev. 2.0, May 2004, pg. 2100-129.

Chooi and Lui do not describe or suggest the elements of the claims, either separately or in combination, namely, the use of an oxidizing gas mixture comprising carbon monoxide (CO) to remove the photoresist when the dielectric has been previously etched to expose the barrier layer.

Additionally, in Chooi and Lui, there is no motivation to combine these references because Chooi describes an oxidizing gas mixture to remove a photoresist and Lui uses a reducing gas mixture to remove a photoresist.

Finally, neither Chooi or Lui suggests how one skilled in the art of IC fabrication would have success in using carbon monoxide (CO), a reducing agent, in an oxidizing gas mixture to remove the photoresist.

Therefore, Applicant respectfully submits that independent claims 1, 9, 15, 20 and 21, are not taught nor suggested by Chooi in view of Lui.

Since independent claims 1, 9, 15, 20 and 21 overcome the 35 USC §103 rejection, Applicant requests that the remaining dependent claims also overcome the obviousness rejection by way of their dependencies.

Conclusion

For all the foregoing reasons, allowance of claims 1-21 pending in the present application is respectfully requested.

Respectfully Submitted,

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